

# Peoples' Perception Towards Urban Forestry and Institutional Involvement in Metropolitan Cities: A Survey of Lalitpur City in Nepal

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**Abstract** Universally, trees have been recognized as an important component of urban landscapes for millennia because they provide a wide range of benefits to society. Although the planting of trees has been an integral and important part of human settlements in Nepal, the concept of urban forestry is poorly understood and often neglected. This paper investigates urban peoples' perceptions towards urban forests as well as the perceived benefits related to the use and existence of urban forests in Lalitpur, Nepal. A survey was conducted among residents and visitors to an urban park. Most respondents held positive attitudes towards urban forests and were aware of the benefits provided. Despite involvement of various agents from both government and non-governmental organizations in promoting urban forests, greenery was declining in the city. The loss and degradation of urban forests adversely affected the ecosystems because the city is suffering from water, air and soil pollution. In recent years, the local government has promoted urban greenery; however, there are no accompanying legislation or regulations governing urban forestry. Therefore, concrete scientific and professional knowledge is required in order to manage the forestry in the city.

**Keywords** Amenity values · Public awareness · Green infrastructure · Landscape

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## Introduction

Forest not only provide timber and non-timber products but also provide various services to society, including an attractive landscape, hydrological regulation, biodiversity preservation, prevention of adverse outcomes (soil erosion, floods and landslides, desertification), and local air quality improvement (Tyrvaenen and Vaananen 1998; Loures et al. 2007; MOF 2010). Urban forests have been recognized as an important component of urban landscapes and their recreational values for millennia (Miller 1997; Tyrvaenen et al. 2006). Urban forests are reported to produce multiple benefits including a broad range of environmental, urban landscape, economic and psychological benefits, and hence are universally valued and considered as essential elements for maintaining the quality of urban life (Tyrvaenen 2001; Heynen and Lindsey 2003; Jankovska et al. 2010).

Urban forests can sequester CO<sub>2</sub>, and regulate the microclimate, and thus can decrease atmospheric concentrations of greenhouse gases (GHG) substantially (Jim and Chen 2009). Additionally, urban forests have the potential to withhold carbon emitted from anthropogenic sources and hence play a major role in mitigating the global warming (Poudyal et al. 2010). The general perception of humans towards urban forests is that humans relate emotionally to natural elements mostly in optimistic views and people prefer landscape which is perceived as natural (Balram and Dragicevic 2005; Jankovska et al. 2010). Therefore, urban forests contribute to sustainable urban development by improving the quality of life and environmental quality in cities (Konijnendijk et al. 2006).

Forests are an important element of our everyday lives, and hence the evaluation of forests is an inseparable part of the process of environmental planning, management and decision-making during the formulation of policies (Tyrvaenen 2001; Tyrvaenen et al. 2006; Jankovska et al. 2010). Because the environment is a multi-dimensional construct, landscapes should be evaluated in terms of geographical, ecological and socioeconomic aspects, which often leads into a comprehensive multilevel hierarchical system (Balram and Dragicevic 2005; Konijnendijk et al. 2007). Therefore, landscape assessment for planning and decision-making, at local and regional levels, is a key process in maintaining sustainable landscape management (Jankovska et al. 2010).

In general, the promotion of conservation and management of urban forests is strongly influenced by level of ecological knowledge because people with a greater knowledge of ecosystems are more likely to prefer ecologically sustainable landscapes (Gobster 1999; Ramos and Panagopoulos 2007). Urban forestry is well instituted in developed countries; however, implementation is still in its infancy in developing countries (Tyrvaenen 2001; Konijnendijk et al. 2006; Jankovska et al. 2010). Urban forestry is poorly understood and neglected in Nepal, although urban forests are reported to generate multiple benefits to the society (Bista 2009).

The process of rapid urbanization is not limited to industrialized countries but also takes place in developing countries including Nepal (where urbanization is carried out haphazardly) which are experiencing rise in urban population (Bista 2009). This is mainly due to the migration of people from rural to urban areas for education, health facilities and employment opportunities, which most rural areas of

Nepal lack. In the process of urbanization, however, the wider criteria for environmental quality have been less discussed and prioritized, the landscape being seen to be one of the key components in creating a positive image of a town (Tyrvaïnen 2001; Tyrvaïnen et al. 2006). High infill of residential areas will often change the urban landscape continuously as a city grows over time and space, and result in an increasing demand for land for building purposes within city limits and hence loss of allocated green spaces (Tyrvaïnen 2001; Jankovska et al. 2010). This increases pressure on remaining green areas as well as increasing environmental degradation (Sandstrom et al. 2006; Jankovska et al. 2010).

The history of Nepalese forest policy is divided into three specific time periods, namely privatization (1768–1951), nationalization (1951–1987) and participation (1987 onward) (Messerschmidt et al. 1994; Hobley 1996; Pokharel 1997). Prior to 1950, a feudal autocratic Rana regime governed the country and forests were controlled by local elites (Gautam 2006). *The Forest Nationalization Act 1957* was promulgated to protect, manage and utilize the forests of Nepal as state property (Gilmour et al. 1989; Acharya 2002). However, this Act became unpopular amongst the public and turned out to be a major facilitator for accelerated deforestation because it undermined the traditional rights of indigenous people who had been managing and utilizing forests according to locally developed practices (Shrestha 1999; Wagley and Ojha 2002). *The Forest Act 1961* and *the Special Forest Protection Act 1967* were enacted with special arrangements for forest protection throughout the country (Wagley and Ojha 2002). However, these acts failed to democratize the regulation of forests and several attempts were made by the government of Nepal to introduce sound forest policies and management strategies (Joshi and Maharjan 2007). In particular, the government formulated the *National Forest Plan* in 1976 to recognize the importance of people's participation in forest management (Adhikari et al. 2007; MOF 2010).

Subsequent to nationalization, the government formulated and enacted *The Panchayat Forests and the Panchayat Protected Forest Regulations* in 1978 to protect and manage national forests (Wagley and Ojha 2002; Gautam 2006). After restoration of democracy in the country, the new government enacted *The Forest Act 1993* that transferred all accessible forestland from the central government to local communities through the creation of *Forest User Groups* (Wagley and Ojha 2002; Adhikari et al. 2007). *The Forest Act 1993* is considered to be one of the most progressive pieces of legislation in Nepal, and provides full authority to the users for management of forests (Acharya 2002). This Act abandons the national forests and reclassifies these into five categories: government managed forests, community forests, leasehold forests, private forests and religious forests (Wagley and Ojha 2002).

The Acts and Bylaws relating to forestry have not yet considered urban forestry as a potential sector for urban development in the country. Urban forestry is widely perceived in Nepal as an activity that is aesthetically oriented and desirable but not necessarily essential. There is an urgent need to assess the level of awareness among the urban people regarding urban forestry so that required programs can be implemented for the development of urban greenery in Nepal.

The aim of this research has been to ascertain urban community perceptions towards urban forests as well as the perceived benefits related to the existence and use of urban forests, in Lalitpur, Nepal. This study was designed to improve the understanding of the importance of urban forests throughout Nepal. Although urban forests provide a broad range of social, economic and environmental services, this is the least researched aspect in Nepal compared to other forest regimes including community forestry, leasehold forestry, private forests and protected areas.

## The Study Site

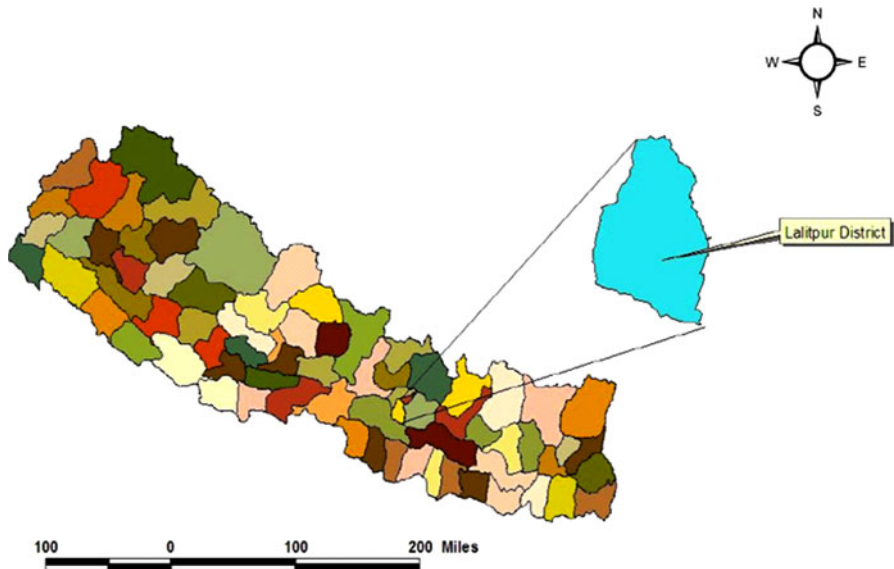
Nepal is a small landlocked country with a total area of 147,181 km<sup>2</sup>, in which more than 80% of people live on subsistence agriculture in rural areas (Gautam et al. 2009). Nepal's economy is mainly structured by the agriculture sector which accounts more than 85% of human resource involvement and in 2009–2010 contributed 33% of gross domestic product (Gautam et al. 2009; MOF 2010). Along with agriculture, forestry is the dominant land-use system of the country, with 24.7% (3.64 M ha) of land covered by forest and 12.9% (1.90 M ha) by shrub (FAO 2006). Most of the population rely entirely on agriculture and forests for deriving their basic needs (Acharya 2002).

Lalitpur (latitude 27°39' to 27°41'N, longitude 85°18' to 85°21'E) is located in eastern Nepal (Fig. 1), and is the largest sub-metropolitan city in the Lalitpur District. It has a land area of 15.46 km<sup>2</sup> and is divided into 22 wards. It has a population of 162,991 constituting a total of 68,922 households with an average family size of 4.66 persons, and a male-to-female ratio of 1.08 (CBS 2001). Lalitpur offers a unique opportunity for studying the real-time urban forestry response to continuing development during a period of rapid economic change in the country.

The city is relatively flat, with an elevation range of 1,280–1,330 masl. It lies within the warm temperate climatic zone of Kathmandu valley, with typical monsoonal two-season per year climate. The average annual temperature in the valley is 15–20°C, reaching maximum 32°C during summer and a minimum of 2°C in winter. The annual average precipitation is typically in the range 2,000–2,400 mm, with most rain falling during the months of June to September.

## Research Method

Primary data were collected through a household sample survey in Lalitpur in 2008. A questionnaire was developed to elicit data on the constraints, opportunities, activities and challenges for promoting urban forestry in the city. Questionnaires were prepared in Nepali language for the convenience of the respondents. The perceptions and attitudes of respondents were measured in terms of level of agreement to statements, on a three-point Likert scale. The questionnaire consisted of four parts: (1) socio-economic background of the respondents, including their land, livelihood strategies and source of income; (2) attitude towards the urban forests including parks and gardens in the city; (3) negative perceptions of urban



**Fig. 1** Map of the study area. *Source:* DDC (2009)

forests; (4) problems faced due to degradation of urban forests and how these affected their livelihoods; (5) resources derived from the urban forests; and (6) a simplistic willingness-to-pay (WTP) approach to gain an indication of individual valuations of changes in the availability of urban forests. The questionnaire was tested on a household in Lalitpur (Sanepa) district. Some questions were added, some revised, and some deleted as not relevant to the local context. Data were collected from both residents who have lived in the area for a long period and those newly settled.

A total of 120 urban households were randomly selected for personal interview. Household names were obtained from voting lists. Three categories of site were selected before the survey. About 33% of the households (respondents) were interviewed from the residential area in Lalitpur city (Sanepa and Jhamsikhel). Another 33% were from the commercial area in Jawalakhel, Pulchowk and Lagankhel, and the remaining 34% were from those visiting the parks at Jwagol and Godavari. These sites were selected anticipating differing perspectives on urban forestry of people living in and visiting different locations in Lalitpur.

Secondary data in the form of reports, published and unpublished articles and brochures were collected from the offices of Lalitpur Sub-Metropolitan City (LSMC), Department of Road (DOR), Department of Forest (DOF), District Forest Office-Lalitpur (DFOL), Institute of Forestry (IOF) library, National Trust for Nature Conservation (NTNC), International Centre for Integrated Mountain Development (ICIMOD), and District Development Center (DDC) of Lalitpur.

The survey data were analyzed both qualitatively and quantitatively, and summarized in the form of tables and graphs. All the respondents were stratified by: (1) age, in groups 16–25 years, 26–40 years and 41–60 years; (2) ethnicity and

caste; (3) educational status; and (4) socioeconomic status. The data were analyzed using MS Excel 2010 and SPSS 16. The weighted means of Likert scores were used for analyzing local people's perceptions regarding urban forestry.

## Results and Discussion

In general, the respondents had a positive attitude towards urban forests in the city. Benefits related to nature were valued most highly (Table 1). About 81% of the respondents stated that urban forests have substantial positive impact on human health. Similarly, 88% of the respondents considered that urban forests are important for maintaining aesthetic environment in the city. Furthermore, the benefits attached to local environment, including CO<sub>2</sub> removal, is also considered to be important.

In order to simplify the results, respondents were divided into four categories in terms of their educational status: illiterate (15%), below grade 10 (19%), up to grade 10 (9%), and after grade 10 (57%). Respondents were asked what level of knowledge they have about benefit of urban forestry. It was found that the majority of respondents who attained higher education (above grade 10) have knowledge about ecosystem and perceive urban forest as an important element for sustainable landscapes. The majority of the respondents agreed that naturalistic landscapes are easier to create and maintain than horticultural areas and therefore are more viable in the context of local government budgets if managed properly. However, the importance of urban forest is unclear among the illiterate respondents.

During the survey, respondents were also asked to comment about the status of greenery in their surroundings. Paradoxically, 67% stated that greenery is decreasing while 16% replied increasing and 17% did not perceive any change. High population density, deforestation, unplanned urbanization, various construction and development works, and lack of knowledge about the importance of ecosystems were considered major reasons of declining greenery in the city. Respondents were queried about their participation in the urban forestry program,

**Table 1** Perception of people towards urban forests in Lalitpur Sub-Metropolitan City

Statement	Response (%)			Weighted mean Likert score
	Disagree	Neutral	Agree	
Trees in urban forests are beneficial to human health	9.9	8.91	81.19	2.71
Trees in urban areas increase landscape beauty	2.97	8.91	88.11	2.85
There is an urgent need to launch efficient urban forestry program to Lalitpur district	15.84	35.6	48.5	2.33
Roadside plantations are necessary in the city	7.9	21.7	70.4	2.62
People's involvement in urban forestry activities is necessary	10.9	53.46	35.64	2.25
People feel ownership in roadside plantation	53.46	15.84	30.69	1.77
Trees regulate local environment	12.87	39.6	47.5	2.35

**Table 2** Land use classification in Lalitpur Sub-Metropolitan City

Land use	Area covered (km <sup>2</sup> )
Cultivated land	7.33
Residential	0.6
Occupational	0.047
Industrial area	0.46
Educational institutions	1.66
Roads	0.34
Forests	0.03
Residential	5.18
Total	15.46

*Source:* LSMC Office Brochure (2006). The LSMC office brochure is a handy official publication by Lalitpur sub-metropolitan city describing the cultural, social, demographic, land use and other general information about Lalitpur sub-metropolitan area

and surprisingly 73% replied that they have never participated in a greenery campaign.

The survey revealed that to some extent nature of residency also influences promotion of urban forests in the locality. More than 77% of the respondents were local dwellers, the remainder having migrated from neighbouring cities and villages or other parts of the country. Local residents were more aware about canopy cover in their surroundings compared to the migrants. Some migrants viewed recreational parks of having negative externalities such as noise and congestion caused by the people visiting the park. Moreover, migrated population members were less concerned about the park features. However, the rising standard of living and changing employment and lifestyle pattern as well as compact (densely populated) city policies were accompanied by an ever-increasing demand for outdoor recreation, and hence urban forests are envisaged as an important element of everyday lives and a major element of the landscapes to provide recreational services in the city.

From a socioeconomic viewpoint, LSMC is relatively wealth and self-sustaining, with a strong agricultural and economic base. Table 2 summarizes the pattern of land use and landscape management in Lalitpur district. The major land uses are agriculture (47.4%) and residential land (33.5%), with only 0.2% of the area occupied by forests.

In the past 16 years, substantial agricultural land had been converted into urban residential areas, e.g. agricultural land decreased by 34.2% during the period between 1984 (41,950 ha) to 2000 (27,570 ha) (Lalitpur DDC Office 2008).<sup>1</sup> On the other hand, urban land (for residential and other business purposes) increased substantially, from 3,096 ha to 9,198 ha between 1984 and 2000 (Lalitpur DDC Office 2008).<sup>2</sup> Over the past three decades, the process of rapid urbanization, rising living standards and increased motorization resulted in the loss and degradation of urban forests in Nepal (Thapa and Murayama 2010). The unprecedented rise in urban population has resulted in an increasing demand for land within city limits

<sup>1</sup> A district development committee (DDC) is located in each of the 75 districts of Nepal, and carries out the role of local government.

<sup>2</sup> See Footnote 1.

including land allocated to green spaces (Thapa et al. 2007; Thapa and Murayam 2009). Infill of the residential areas decreased the amount of green space as well as causing environmental degradation and placed pressure on remaining green areas (Thapa et al. 2007; Thapa and Murayama 2010). Thus, the task of managing urban growth has increased in both scope and complexity and has become one of the most important challenges for the Nepalese government.

### Urban Forest Use

The survey revealed that more than 87% of the respondents were familiar with the benefits of urban forest. Households with low socioeconomic status were found to have relatively low concern for urban forest nature benefit; these derived their livelihood from local resources, especially by collecting firewood and fodder from nearby forests. Respondents were asked about the major benefits of urban forests. About 45% of them agreed that urban forests maintain ecological balance and thus the evaluation of nature is an inseparable part of the process of environmental planning, management and decision-making for sustainable urban development. A further 40% of the respondents agreed that urban forests could possibly provide social and economic opportunities to communities by developing 'Green Infrastructure' programs which focus on identifying interconnected networks of green space including natural parks and botanical gardens. The remaining 15% of the respondents stated that urban forests, especially along roadways, provide shade to pedestrians and shelter for many birds.

The survey found that greenery is declining in the city. The major reasons reported (by 66%) were that government ignores the urban forestry. The remainder stated that most of the potential land for urban forests belongs to the private sector which is reluctant to grow crops or plant trees. This is because households used to obtain high financial returns from selling their land for residential development. Because of this pessimistic view, respondents were asked to comment on what can be done to promote and create awareness of the importance of urban forests among the residents. As depicted in Table 3, many respondents stated that awareness programs (40) and tree planting activities (49) should be conducted among the urban residents as effective strategies for urban forestry.

**Table 3** Activities identified by respondents as needed for the promotion of urban forests in the Lalitpur Sub-Metropolitan City

Particular	Frequency of respondent
Awareness of the existence of areas planted with trees	40
Tree planting along roadsides	49
Allocation of budget for urban forestry	3
Integrated policies	21
Park development at local level	2
Coordination among various organizations	5



Most of the respondents visited the recreational areas during weekends. One-third visited the green spaces two to three times a week. Interestingly, a high visit rate to the recreational areas was found among the age group of 20–30 years. One-fifth of the respondents stated that they use the recreational areas for meeting their friends.

### Involvement of Institutions in Promotion of Urban Forests in LSMC

Realizing the importance of urban forests for the wellbeing of the urban populations, the Nepal government has initiated various activities including tree planting, park development, greenbelts, nurseries, and awareness raising activities, aiming to increase greenery in the valley (Table 4). Along with government, NGOs and international organization are working to enhance greenery in Lalitpur. Governmental organizations including District Development Committee, Lalitpur sub-metropolitan city office, Department of Forest, Nagar Bikash and Department of Roads have been actively involved in promoting and creating awareness of urban forests among residents in the city. All these organizations provide funding and land as well as manpower for establishing parks and planting trees within the city.

NGOs including the United Nations Park Development Committee, NTNC, Bird Conservation Nepal, Environmental Camps for Conservation Awareness (ECCA-Nepal) and Youth Awareness Environmental Forum (YAEF) have been working effectively in promoting urban forests in the city since 2000. Universities and colleges have also participated in tree plantation as well as being actively involved in promoting the greenery among the illiterate dwellers. In addition, many private organizations including Himalayan Distilleries (a brewery company), Standard Chartered Bank and Chaudhary Enterprises have been involved in city beautification by maintaining traffic islands and protecting planted areas using tree guards. As depicted in Fig. 2, local governments and authorities in Lalitpur city have been

**Table 4** Parks developed in the LSMC

Name of park	Location	Establishment year
Bagmati river nature park (UN Park)	Jwagal	1996
Manmohan park	Balkhu	2004
B.P. park	Lalitpur-2, Balkhu	2003
Sahid Sukra park	Patan Dhoka	Not known
Lamu Chaur community park	Jawalakhel	Not known
Dhobighat environment garden	Dhobighat	2006
Balkumari park	Balkumari	Not known
Gwarko park	Pinche Tole, Balkumari	2006
Jestha Nagarik Shanti Vatika	Sanepa-2, Lalitpur	2008
Shahid Smarak park	Sanepa-2, Lalitpur	2008
Rotatory Park of Lagankhel	Lalitpur	Not known
Krishna Mohan Nudeep Memorial Garden	Bagdol, Lalitpur	2004
Bagmati Sewa Samiti	Shankhamul, Lalitpur	2009

*Source:* The dates of the establishment of the parks were collected during household interviews, no documented sources being identified



**Fig. 2** Vistas of urban trees in roadside, parks and residential areas in the Lalitpur sub-metropolitan city

actively involved in establishing parks and gardens, mainly for enhancing greenery in the city. In recent years, attention has been drawn to urban forestry even by real estate agencies because people prefer to buy their apartments and houses close to a green environment. At present, urban forestry is receiving priority, although government did not allocate green space on a large scale.

#### Willingness to Pay for Recreation Areas

Although there is little information on the type of benefits people obtain from urban forests, the majority of the respondents reported that they were willing to pay for the use of recreational areas. However, up to now there are few if any such parks and gardens where visitors have to pay for entry in Nepal. Moreover, all the existing parks and gardens within the Lalitpur were found to be small in area and have low visitation rates. Godavari Botanical Garden, located approximately 5 km from the LSMC city centre, is one of the attractions for people in Lalitpur and Kathmandu. The gardens are open daily from 9 am and close at 4 pm in winter and 5 pm in other seasons. As an entry fee, a visitor has to pay NR 10 for Nepalese, NR 20 for South Asian Association for Regional Cooperation (SAARC) citizens and NR 50 for non-SAARC foreigners (1 USD = NR 71.4).

Data regarding people's valuation of gardens were collected by asking respondents to state their WTP for their visit to the Godavari Botanical Gardens. Interestingly, the level of respondents' WTP varied between age groups. The

highest WTP for the use of park was found in the age-group of 18–35 years, followed by the age-group of 40–60 years. Among the age group of 18–35, approximately 80% of the respondents reported they were willing to make payment for recreational values, and in the age-group of 40–60 nearly 70% were willing to pay for recreational areas. People visit this park mainly for the purpose of picnics, educational tours and (for most of the adults) for meeting with friends.

## Policy Implications and Conclusion

The concept of urban forestry is still in infancy in Nepal although it is well instituted in the developed world. A number of policy implications may be drawn from the survey findings on how to promote urban forestry in Nepal. Although an understanding of the multiple functions of urban forests is reasonably developed, it is not integrated into the urban landscape planning, design and management process in Nepal. Because sustainable urban forestry and monitoring is given little emphasis by the Ministry of Forest and Soil Conservation and Ministry of Environment of the Government of Nepal, cities have been developing in an environmentally unsustainable way. There are increased pressures on the land use in urban population centres - particularly in Pokhara, Kathmandu, Bhaktapur and Lalitpur. However, the survey findings underscore the need to monitor systematically and investigate changes in land conservation and management practices over time in urban areas experiencing rapid population growth.

The unprecedented increase in population in major cities including Bhaktapur, Kathmandu and Lalitpur have already resulted in the encroachment of agricultural land and more recently on fertile land along river floodplains close to the developed areas of the cities. Because of such unsustainable urban development, environmental quality is degraded resulting in air, water and soil pollution in the cities. Therefore, the high appreciation of the amenity benefits of urban forests and the multiple functions of urban trees stress the importance and need for multi-objective urban forest policies and management plans in Nepalese municipalities. In these municipalities, local governments—as the level of administration closest to citizens in delivering quality of life—have sole authority and responsibility to promote, protect and support urban forestry. Consequently, municipal governments are crucial in realizing the sustainable urban development in practice, both directly in the urban setting and indirectly by taking decisions about the whole landscape in Nepal.

This study indicates that a joint effort by local governments and local people would improve the prospects of urban forests in Nepal. The current forest policy and forestry legislation in Nepal, however, does not acknowledge this possibility because there are no provisional legislative acts and regulations pertinent to urban forestry. At present, although local governments have started to incorporate in their plans the modern ideas of land conservation that provides a green solution to many of the problems associated with urban sprawling development, all these activities are on a small scale. This study highlights the necessity of revising existing forest policy and adopting new legislation to allow cooperation between local residents and municipal governments towards urban forest conservation.

Community perceptions and institutional involvement in promotion of urban forests in LSMC were impressively positive. The majority of the local residents were aware of the multiple benefits that urban forests provide. Additionally, a number of organizations including both government agencies and NGOs were actively working to promote greenery in the city. The local governments also realized that at the municipal level, it is necessary to assess whether the provision of recreational services is in balance with the demand for these areas. Nevertheless, the survey revealed that the greenery in Lalitpur city is decreasing and still there are limited data on attitudes of professional groups including managers and planners to urban forests. It is argued here that local governments should pay attention to conservation and management by adopting and implementing new plans and policies in favour of increasing greenery. More effort is required to promote urban forests simultaneously with other developmental activities in the urban areas. Moreover, scientific and professional knowledge as well as practice are required to promote the conservation and management of urban forests effectively as green infrastructure in the city.

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